

Homma et al. (U.S. Patent No. 5,420,075 - hereafter Homma) or Kobayashi et al. (U.S. Patent No. 6,214,748 - hereafter Kobayashi).

Applicants have canceled claims 4 and 8, as shown above. Accordingly, the § 103(a) rejection of claims 4 and 8 is now moot.

As amended, claims 1 and 6 recite the steps of depositing a fluorine-containing organic film on a semiconductor substrate using a material gas containing fluorocarbon as a main component; and densifying the fluorine-containing organic film by exposing the fluorine-containing organic film to plasma of a rare gas, wherein the fluorocarbon is C₅F₈, C₃F₆ or C₄F₆. Particularly, a novel feature of claims 1 and 6 resides the depositing a fluorine-containing organic film on a semiconductor substrate using a material gas containing fluorocarbon as a main component, wherein the fluorocarbon is C₅F₈, C₃F₆ or C₄F₆.

As shown in Table 1 and as discussed in, e.g., page 16, lines 6-9 of the present specification, C₅F₈ gas, C₃F₆ gas, and C₄F₆ gas have short atmospheric life and are small in GWP₁₀₀, and therefore do not easily cause global warming. For this reason, these gases are preferable to other perfluorocarbon gases. There is no suggestion in the cited references that these particular gases would be effective.

Turning to the cited references, with respect to Akabori, although the reference discloses CF₄ gas, C₂F₆ gas, C₃F₈ gas, and C₄F₈ gas for depositing a fluorine-containing organic film as indicated in lines 40-45 of column 7, Akabori is silent about C₅F₈ gas, C₃F₆ gas, and C₄F₆ gas.

With respect to Homma, although Homma teaches a step of depositing silicon oxide film as an insulating film, Homma fails to disclose a step of depositing a fluorine-containing organic film, as well as a step of depositing a fluorine-containing organic film using a material gas containing fluorocarbon as a main component, wherein the fluorocarbon is C₅F₈, C₃F₆ or C₄F₆.

Further, although Kobayashi teaches a step of depositing BPSG film as an insulating film, Kobayashi fails to disclose a step of depositing a fluorine-containing organic film, as well as a step of depositing a fluorine-containing organic film using a material gas containing fluorocarbon as a main component, wherein the fluorocarbon is C₅F₈, C₃F₆ or C₄F₆.

Applicants respectfully submit that the requirements for establish a *prima facie* case of obviousness, as detailed in MPEP § 2143 - 2143.03 (pages 2100-122 - 2100-136), are: first, there must be some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to

combine the teachings; second, there must be a reasonable expectation of success; and, finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations.

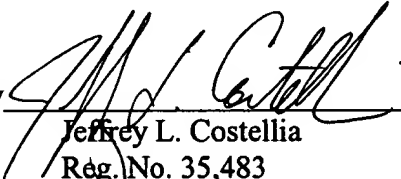
As the cited prior art references fail to teach, disclose, or suggest using a gas containing fluorocarbon as a main component in a reactor chamber of a plasma processing apparatus, wherein the fluorocarbon is C_5F_8 , C_3F_6 or C_4F_6 , a prima facie case of obviousness cannot be established, and the §103(a) rejection of claims 1-9 is insupportable.

In view of the foregoing amendments and arguments, Applicants respectfully request reconsideration and withdrawal of the U.S.C. § 103(a) rejections of claims 1-9.

CONCLUSION

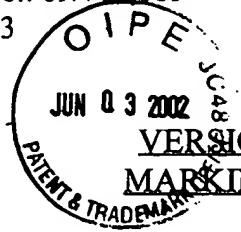
Having responded to all rejections set forth in the outstanding Final Office Action, it is submitted that claims 1-3, 5-7, and 9 are now in condition for allowance. An early and favorable Notice of Allowance is respectfully solicited. In the event that the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, the Examiner is courteously requested to contact Applicants' undersigned representative.

Respectfully submitted,

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VERSION OF AMENDED CLAIM WITH
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1. (Amended) A method for fabricating a semiconductor device, comprising the steps of:

depositing a fluorine-containing organic film on a semiconductor substrate using a material gas containing fluorocarbon as a main component in a reactor chamber of a plasma processing apparatus; and

densifying the fluorine-containing organic film by exposing the fluorine-containing organic film to plasma of a rare gas in the same reactor chamber,

wherein the fluorocarbon is C₅F₈, C₃F₆ or C₄F₆.

6. (Amended) A method for fabricating a semiconductor device, comprising the steps of:

forming a mask pattern made of a resist film or an insulating film on a metal film on a metal film deposited on a semiconductor substrate;

dry-etching the metal film using the mask pattern to form a plurality of metal interconnections made of the metal film;

depositing an interlayer insulating film made of a fluorine-containing organic film between the plurality of metal interconnections and on top surfaces of the metal interconnections using a gas containing fluorocarbon as a main component in a reactor chamber of a plasma processing apparatus; and

densifying the fluorine-containing organic film by exposing the fluorine-containing organic film to plasma of a rare gas in the same reactor chamber,

wherein the fluorocarbon is C₅F₈, C₃F₆ or C₄F₆.